

Abstract

A bone strength and mineralization regulatory (“BSMR”) protein is provided that can exist in multiple forms and that affects bone density. Polymorphic gene sequences of the protein are provided that are diagnostic of predisposition to osteoporosis. Other detection tools, compositions and methods of their use also are provided for predicting, evaluating and altering bone strength and mineralization status. The invention provides new natural and synthetic pharmaceuticals that effect the BSMR regulatory pathway and improve bone status. Tools also are provided for finding new pharmaceuticals that operate by binding to BSMR and that activate and/or deactivate this protein’s biological function related to osteoporosis and blood vessel formation.